

AMENDMENTS TO THE CLAIMS

The claims in this listing will replace all prior versions, and listings, of claims in the application.

LISTING OF CLAIMS

1. (Previously Presented) A data storage medium for recording and reproducing a file managed using a volume/file structure, the data storage medium storing data content comprising:

address information for a root directory; and

root directory file management information that includes start address information for an unrecorded area existing in a volume space, the root directory file management information being configured to be updated when a new file is recorded on the data storage medium by storing new root directory file management information in the unrecorded area for which start address information is recorded.

2. (Previously Presented) A data storage medium as described in claim 1, wherein the start address information is recorded using an indirect entry that manages a root directory file recording area.

3. (Previously Presented) A data storage medium for recording and reproducing a file managed using a volume/file structure, the data storage medium storing data content comprising:

address information for a root directory;

invalid data not used for retrieving volume/file structure data; and
root directory file management information, the root directory file management information comprising invalid extent management information that manages an invalid data recording area.

4. (Previously Presented) A data storage medium as described in claim 3, wherein the invalid extent management information is recorded using an allocation descriptor that manages a root directory file recording area.

5. (Previously Presented) A data storage medium for recording and reproducing a file managed using a volume/file structure, the data storage medium storing data content comprising:

address information for a file set descriptor;

root directory file management information that is plurally recorded as main chaining information and reserve chaining information, the reserve chaining information being a duplicate of the main chaining information;

first address information, corresponding to an area in which the main chaining information and the reserve chaining information are recorded at a beginning of a volume space, that is recorded as part of the file set descriptor; and

second address information, corresponding to an area in which the main chaining information and the reserve chaining information is update recorded,

that is recorded as part of the main chaining information and the reserve chaining information.

6. (Previously Presented) A data recording method for performing a formatting process on a data storage medium for recording and reproducing a file managed using a volume/file structure, the method comprising:

recording address information for a root directory in the data storage medium; and

recording root directory file management information in the data storage medium, the recorded root directory file management information including chaining information, the chaining information comprising start address information for an unrecorded area existing in a volume space,

the root directory file management information being configured to be updated when a new file is recorded in the data storage medium by storing new root directory file management information in the unrecorded area for which start address information is recorded.

7. (Previously Presented) A data recording method as described in claim 6, wherein recording the chaining information further comprises recording the start address information for the unrecorded area using an indirect entry that manages a root directory file recording area.

8. (Previously Presented) A data recording method for performing a formatting process on a data storage medium for recording and reproducing a file managed using a volume/file structure, the method comprising:

recording address information for a root directory in the data storage medium;

recording invalid data not used for retrieving the volume/file structure in the data storage medium; and

recording root directory file management information in the data storage medium, the recorded root directory file management information including chaining information related to invalid extent management information that manages an invalid data recording area.

9. (Previously Presented) A data recording method as described in claim 8, wherein recording the chaining information further comprises recording the invalid extent management information using an indirect entry that manages a root directory file recording area.

10. (Previously Presented) A data recording method for performing a formatting process on a data storage medium for recording and reproducing a file managed using a volume/file structure, the method comprising:

recording address information for a file set descriptor in the data storage medium;

recording file set information in the data storage medium that includes the file set descriptor, the file set descriptor having address information for an area in which main chaining information and reserve chaining information are recorded at a beginning of a volume space, the reserve chaining information being a duplicate of the main chaining information; and

recording chaining information in the data storage medium, the chaining information including address information of an area for update recording root directory file management information, the main chaining information and the reserve chaining information.

11. (Previously Presented) A data recording apparatus for performing a formatting process on a data storage medium for recording and reproducing a file managed using a volume/file structure, the apparatus comprising:

an address information recorder that records address information for a root directory in the data storage medium; and

a chaining information recorder that records root directory file management information in the data storage medium, the root directory file management information including start address information for an unrecorded area existing in a volume space,

the root directory file management information being configured to be updated when a new file is recorded on the data storage medium by storing new root directory file management information in the unrecorded area for which start address information is recorded.

12. (Previously Presented) A data recording apparatus as described in claim 11, wherein the chaining information recorder records the start address information for the unrecorded area using an indirect entry that manages a root directory file recording area.

13. (Previously Presented) A data recording apparatus for performing a formatting process on a data storage medium for recording and reproducing a file managed using a volume/file structure, the apparatus comprising:

an address information recorder that records address information for a root directory in the data storage medium; and

a chaining information recorder that records invalid data, not used for retrieving volume/file structure, in the data storage medium, and that records root directory file management information in the data storage medium, the recorded root directory file management information including invalid extent management information that manages an invalid data recording area.

14. (Previously Presented) A data recording apparatus as described in claim 13, wherein the chaining information recorder records the invalid extent management information using an indirect entry that manages a root directory file recording area.

15. (Previously Presented) A data recording apparatus for performing a formatting process on a data storage medium for recording and reproducing a file managed using a volume/file structure, the apparatus comprising:

an address information recorder that records address information for a file set descriptor in the data storage medium;

a file set information recorder that records a file set descriptor in the data storage medium, the file set descriptor including address information for an area in which main chaining information and reserve chaining information are recorded at a beginning of a volume space, the reserve chaining information being a duplicate of the main chaining information; and

a chaining information recorder that plurally records address information of an area in which root directory file management information, the main chaining information and the reserve chaining information is update recorded.

16. (Previously Presented) A data recording method for performing a file recording process on a data storage medium for recording and reproducing a file managed using a volume/file structure, the method comprising:

recording address information for a root directory in the data storage medium; and

recording root directory file management information in the data storage medium, the root directory file management information including chaining information having start address information for an unrecorded area existing in a volume space,

the root directory file management information being configured to be updated when a new file is recorded on the data storage medium by storing new root directory file management information in the unrecorded area for which start address information is recorded.

17. (Previously Presented) A data recording method as described in claim 16, wherein recording the chaining information further comprises recording the start address information for the unrecorded area using an indirect entry that manages a root directory file recording area.

18. (Previously Presented) A data recording method for performing a file recording process on a data storage medium for recording and reproducing a file managed using a volume/file structure, the method comprising:

recording address information for a root directory in the data storage medium;

recording invalid data not used for retrieving the volume/file structure in the data storage medium; and

recording root directory file management information in the data storage medium, the root directory file management information including chaining information having invalid extent management information that manages an invalid data recording area.

19. (Previously Presented) A data recording method as described in claim 18, wherein recording the chaining information further comprises recording the invalid extent management information using an indirect entry that manages a root directory file recording area.

20. (Previously Presented) A data recording method for performing a file recording process on a data storage medium for recording and reproducing a file managed using a volume/file structure, the method comprising:

reproducing file set information, the reproduced file set information including address information of an area in which main chaining information and reserve chaining information are recorded at a beginning of a volume space using a file set descriptor, the reserve chaining information being a duplicate of the main chaining information;

recording root directory file management information including chaining information that includes the main chaining information and the reserve chaining information, and

recording address information of an area in which the root directory file management information, including the main chaining information and the reserve chaining information, is update recorded.

21. (Previously Presented) A data recording apparatus for performing a file recording process on a data storage medium for recording and reproducing a file managed using a volume/file structure, the apparatus comprising:

an address information recorder that records address information for a root directory in the data storage medium; and

a chaining information recorder that records root directory file management information in the data storage medium, the root directory file management information including start address information for an unrecorded area existing in a volume space,

the root directory file management information being configured to be updated when a new file is recorded on the data storage medium by storing new root directory file management information in the unrecorded area for which start address information is recorded.

22. (Previously Presented) A data recording apparatus as described in claim 21, wherein the chaining information recorder records the start address information for the unrecorded area using an indirect entry that manages a root directory file recording area.

23. (Previously Presented) A data recording apparatus for performing a file recording process on a data storage medium for recording and reproducing a file managed using a volume/file structure, the apparatus comprising:

an address information recorder that records address information for a root directory; and

a chaining information recorder that records invalid data not used for retrieving the volume/file structure, and that records root directory file

management information having invalid extent management information that manages an invalid data recording area.

24. (Previously Presented) A data recording apparatus as described in claim 23, wherein the chaining information recorder records the invalid extent management information using an indirect entry that manages a root directory file recording area.

25. (Previously Presented) A data recording apparatus for performing a file recording process on a data storage medium for recording and reproducing a file managed using a volume/file structure, the apparatus comprising:

an address information reproducer that reproduces address information for a file set descriptor;

a file set information reproducer that reproduces address information of an area in which main chaining information and reserve chaining information are recorded at a beginning of a volume space using the file set descriptor, the reserve chaining information being a duplicate of the main chaining information; and

a chaining information recorder that records root directory file management information including the main chaining information and the reserve chaining information, and that records address information of an area in which the root directory file management information, including the main chaining information and the reserve chaining information, are update recorded.

26. (Currently Amended) A data reproducing method for performing a file reproducing process from a data storage medium for recording and reproducing a file managed using a volume/file structure, the method comprising:

reproducing address information for a file set descriptor;

reproducing file set information that includes ~~comprising~~ address information for an area in which main chaining information and reserve chaining information are recorded at a beginning of a volume space using the file set descriptor, the reserve chaining information being a duplicate of the main chaining information; and

reproducing root directory file management information that includes main chaining information and reserve chaining information, the main chaining information and reserve chaining information including address information of an area for update recording the root directory file management information.

27. (Currently Amended) A data reproducing apparatus for performing a file reproducing process from a data storage medium for recording and reproducing a file managed using a volume/file structure, the apparatus comprising:

an address information reproducer that reproduces address information for a file set descriptor;

a file set information reproducer that reproduces address information for an area in which the main chaining information and the reserve chaining

information are recorded at a beginning of a volume space using the file set descriptor, the reserve chaining information being a duplicate of the main chaining information; and

a chaining information recorder that reproduces root directory file management information, including the main chaining information and the reserve chaining information, the main chaining information and reserve chaining information including address information of an area for update recording the root directory file management information.

28. (Previously Presented) A data storage medium as described in claim 3, wherein the invalid extent management information is used to identify large invalid data recording areas to be used as file recording areas.

29. (Previously Presented) A data recording method as described in claim 8, wherein the invalid extent management information is used to identify large invalid data recording areas to be used as file recording areas.

30. (Previously Presented) A data recording apparatus as described in claim 13, wherein the invalid extent management information is used to identify large invalid data recording areas to be used as file recording areas.

31. (Previously Presented) A data recording method as described in claim 18, wherein the invalid extent management information is used to identify large invalid data recording areas to be used as file recording areas.

32. (Previously Presented) A data recording apparatus as described in claim 23, wherein the invalid extent management information is used to identify large invalid data recording areas to be used as file recording areas.